

## Technical Training

### *A new look, using multimedia*



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**B**ently Nevada's technical training courses use a multimedia approach to focus students' attention on the main points of the topic. The Machinery Diagnostics Course is an excellent example of how we integrated multimedia into each topic to make often complex machinery analysis problems easy to understand. The media we currently use in the course are computer-generated slides, computer animation, live demonstrations, video, overhead projection, hands-on workshops and a course workbook. Each topic is enhanced by visual aids and live demonstrations.

All of the topics in our courses have been placed on computer-generated color slides. Many of the graphics used

are plots of actual machine data which can be quite complex. To make these plots easier to understand, we break the major points into individual graphic overlays. Instead of trying to explain five important points at the same time on a plot, we convey one point at a time using a series of overlays.

The Machinery Diagnostics Course includes a topic called Steady State Data Formats which incorporates Orbit Analysis. Computer-generated slides describe how the orbit is generated and how to interpret orbit plots. To dramatize one of the main points, that the orbit is the path of the shaft centerline, computer animation is used to show a cross section of a rotor vibrating within its bearing clearance. After viewing the animation, students can more easily describe what an orbit is and their comprehension is also significantly improved.

We use live demonstrations whenever possible, especially if the attendees are expected to perform the same or a similar activity in the workshop. In our Single Plane Balance Response topic, we show students how a rotor responds and that we can predict the response of the rotor. Students follow along with the instructor and actually balance a single plane rotor. In the workshop, students predict the response of the rotor they are working on and use the techniques we taught them to balance a rotor themselves.

For demonstrations which are difficult to set up or for those which we have a limited supply of special equipment, we use video to emphasize the main points. In the Fluid-induced Instability topic, we use an anti-swirl rig to demonstrate how anti-swirl (fluid injected opposite the direction of shaft rotation) can be used to decrease the fluid circumferential flow to stabilize a rotating system. We often have more than one course scheduled at the same time in different locations throughout the world. In order for all students to benefit from this powerful demonstration, we have videotaped it so, no matter where the instructor is teaching, students can observe the demonstration.

The overhead projector (flip chart, white board, etc.) is used when student responses need to be listed, or direct written instruction is needed to enhance learning.

The course workbook is designed to reinforce what is taught in the course for each topic. As the instructor discusses each topic, the graphics used are contained in the manual along with supporting information that describes the graphic. After the course is completed, the course manual is an effective reference guide to reinforce course material.

Multimedia techniques have been integrated into each Bently Nevada Technical Training course. The result is increased retention of course material and a sharper focus on key points. ■